



Houk-Jung Organic Colloquium

“Lessons from molecular evolution: from origin of life to phage-based nanomaterials”

Abstract:

Molecular evolution is a walk over a fitness landscape, in which populations explore sequence space through mutation and ‘climb’ up fitness peaks. The topography of the fitness landscape governs potential pathways for evolution and determines whether fitness can be optimized by natural selection. We are making exhaustive maps of fitness landscapes for catalytic RNA (ribozymes) by combining *in vitro* selection with a massively parallel kinetic assay using high-throughput sequencing. In addition, we take advantage of the ongoing natural selection of phages in order to engineer phage-based nanomaterials for detection and killing of pathogenic bacteria. These nanomaterials combine evolutionarily optimized attachment strategies of phages with the controllable nature of nanomaterials to circumvent some obstacles to phage therapy.

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